CUTTING DOWN UNCLE SAM'S LAND WASH BILL

A discussion among H. H. Bennett, Bureau of Chemistry and Soils; L. A. Jones, Bureau of Agricultural Engineering; and Perkins Coville, Forest Service, broadcast Wednesday, August 10, in the Department of Agriculture period, National Farm and Home Hour, by a network of 47 associate NBC radio stations.

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SALISBURY:

Farm and Home Hour listeners, today we are going to sit in on a discussion of recent results of research into our national problem of soil erosion. Three of the men in the Department of Agriculture who are taking part in this work have met today to talk over the results.

I present to you Mr. Hugh H. Bennett, in charge of the work of the soil scientists who are helping to carry on the erosion research. Ladies and gentlemen, Mr. Bennett.

BENNETT:

How are you today, folks?

SALISBURY:

Now may I present the chief of the division of drainage and soil erosion control in the Bureau of Agricultural Engineering, the man in charge of the engineering research on soil erosion, Mr. L. A. Jones.

JONES:

I'm glad to visit again with you people of the Farm and Home Hour audience.

SALISBURY:

The Forest Service deals with the problem of erosion control on millions of acres of land in forests and ranges. May I present to you one of its workers on this problem, Mr. Perkins Coville.

COVILLE:

This is my first visit with you Farm and Home listeners, and I'm delighted.

SALISBURY:

Now we're all acquainted. Bennett, you were one of the pioneer evangelists of the doctrine of doing something about our national problem of soil erosion. When did you first begin to realize the size of Uncle Sam's land wash bill?

(over)

BENNETT:

BENNETT:

Well, Farm and Home folks and Salisbury, I believe I first realized the menace of soil erosion about 25 years ago. The late Dr. Whitney of the Bureau of Soils had asked me and another young fellow to try to find out why the soil of a certain county in the Piedmont section was so poor. We got our first clue when we compared the soil in woods with soil in fields alongside the woods. The woods soil was rich, mellow loam. Then why was the soil in the fields a stiff, droughty clay? We soon discovered that through years of cultivation, the rich, mellow top soil originally present on the field had washed off. Soil erosion had worn out the once fertile plow land of that county.

As we soil surveyors mapped and classified the soils in different sections of the country we found similar conditions in more and more areas. Jones and other agricultural engineers have seen the same thing. Coville and the other men of the Forest Service have observed tremendous destruction by soil washing of forest lands improperly handled and of grazing lands unmercifully overgrazed.

SALISBURY:

I take it from what you say that the problem is present everywhere?

BENNETT:

Correct. We know now that soil erosion is going on at a far greater rate than we thought even a few years ago. We know that erosion affects fully three-quarters of all cultivated land. Erosion has essentially ruined at least 21 million acres of land once in cultivation. Part of the fertile top soil on vast acreages washes away every time enough rain falls to make water run down hill. No other nation of the western hemisphere is wasting its farm lands as rapidly as the United States. Soil erosion is a national problem and an individual problem.

JONES:

And the bad part of it is that sometimes the individual landowner doesn't realize that erosion is destroying his land. One man in Nebraska wrote to his College of Agriculture asking why the soil in many places on his farm was turning from black to brown. He said that the brown spots didn't yield as good crops as they had before the color changed. The soil specialists at the State College told this man that his soil was not changing color but eroding away. The brown spots were areas of subsoil from which the fertile black top soil had washed off. It was hard to believe, because this man's land was not steep, only slightly rolling, and there were not signs of gullies on the place. But it was true.

BENNETT:

Sadly true. The same sort of costly damage is adding to the troubles of thousands of farmers. Our bureau has mapped many large areas in 35 of the 48 states where erosion is a serious menace to farms.

COVILLE:

I might add that surveys made by the Forest Service during the past year

show that erosion of Western water sheds threatens huge farm and city property values. For instance, our survey of the Rio Grand water shed in New Mexico showed that erosion is more or less serious on 75 per cent of the area. Already the silt brought down in floods has filled up a seventh of the capacity of the Elephant Butte reservoir. Soil erosion on this one watershed menaces an agricultural investment of 47 million dollars in the Elephant Butte irrigation project, an assessed valuation of 40 million dollars for lands and improvements in the middle Rio Grande Valley, 700 miles of railroad, thousands of miles of highways, and 15 million acres of range land. Or take the situation in the upper basin of the Colorado River in Utah, Colorado, and Wyoming. The values at stake there are even greater than on the watershed of the Rio Grande. Our survey shows erosion menacing three-quarters of that area.

SALISBURY:

Now will you gentlemen tell us about the results of your recent research work on how to solve this erosion problem? First, Mr. Bennett, where are the soil erosion stations located?

BENNETT:

These stations are located at points where the soils men and engineers can study the erosion troubles of 12 major soil regions; specifically they are located near Guthrie, Oklahoma; Temple, Tyler, and Spur, Texas; Hays, Kansas; Bethany and Columbia, Missouri; Statesville, North Carolina; Pullman, Washington; Clarinda, Iowa; La Crosse, Wisconsin; and Zanesville, Ohio.

SALISBURY:

How do you carry on the work at these stations?

BENNETT:

First, we measure the losses of water and soil from different slopes used for different crops, as well as from bare ground. Secondly, we are trying out every promising practical method of slowing down these losses. The engineers are developing the most effective types of terraces, soil saving dams and farm machinery for use over terraced land. The soils men are trying out different methods of cropping. Briefly, they are determining what place cover crops, grass, and other soil saving plants have in the regional agriculture as a means of saving soil and water.

SALISBURY:

Well, now, after two years of research would you say that erosion is more or less serious than you had previously thought, Mr. Bennett, and Mr. Jones?

JONES:

More serious, I'd say.

BENNETT:

Yes, decidedly.

SALISBURY:

Can you give us an example?

BENNETT:

Well, for instance, the results at Bethany, Missouri. There, land sloping 8 feet in 100 feet and kept under continuous corn cultivation has lost soil at the annual rate of from 100 to 140 tons per acre. That means about an inch of soil a year. Fertile top soil. The average soil depth there is only about 7 inches. So this means that in seven years, under these conditions, man will dispose of his principal capital, the productive top soil.

JONES:

For another instance, you might take the results at the Temple, Texas, station. There one 5-inch rain in 1930 removed 23 tons of soil per acre from 4 per cent slopes planted in cotton. Still another instance was the loss last year of nearly 44 tons of soil per acre from an unterraced area at the Guthrie, Oklahoma, Experiment Station. On a similar terraced area at Guthrie only one and a quarter tons of soil were lost per acre; 1/35th of the loss from unterraced land.

SALISBURY:

So the terraces have been very effective in holding down erosion haven't they?

BENNETT:

Yes indeed. And with proper rotations and cover crops they will be doubly effective. Jones, tell them about the results you got from terracing at Bethany, Missouri.

JONES:

Well, as Bennett told you, at Bethany unterraced land of 8 per cent slope planted to corn lost over 100 tons of soil per acre each year. But the loss from terraced areas of the same slope planted to the same crop was only 1/36th as much, less than 3 tons per acre.

SALISBURY:

Are there any differences in terraces?

JONES:

Yes, there are considerable differences. For instance, we have discovered, that terraces built with channels of slight grade, such as two to four inches per 100 feet, suffer less from erosion in the channel than terraces built with channels of steeper grade, such as 6 inches per 100 feet.

Another important finding at Guthrie is that it costs over six times as much to terrace gullied land as to terrace the virgin land before the gullies are formed.

SALISBURY:

Well, these are interesting results from the terracing work, Jones. Now, Bennett, will you give us some of the results of your work with erosion control by cropping methods?

BENNETT:

One method that has been successful at the Texas station, and that is giving promising results in Oklahoma, North Carolina and Missouri, is strip cropping. We sow strips of thick growing soil saving crops such as oats, sorghum, lespedeza and sweet clover along the contours of slopes. Then we plant broader strips of clean tilled crops such as cotton and corn between the strips of thick growing crops. The thick growing crops slow down the rate at which the water runs off and that, of course, slows down the erosion.

An inexpensive method of controlling small gullies that has worked out at the Bethany station is spreading rapidly in different parts of the country. The method is to fill old fertilizer sacks with soil and grass roots and place these sacks in the bottom of the washes. The roots grow through the sacks, take hold in the ground and quickly establish effective grass dams.

At the Hays, Kansas, Experiment Station, a machine has been developed that digs 10,000 holes per acre on fallow land. The holes hold back about 50 thousand gallons of rain water per acre. Thus they increase absorption of water and reduce erosion. We also are having success at Hays with cultivating row crops along the contours and leaving every third or fourth row open without a crop to act as a water furrow.

Just plain crop rotation slows down erosion enormously, we have found out at all the erosion stations. To give one example of the water-and-soil-saving capacity of vegetation: At the Hays, Kansas, station, native sod has lost eight thousand times less soil and retained 200 times more rainwater than the same land planted to kafir corn, which is a clean-tilled crop.

Coville, I think you should explain here some of the work of the Forest Service cooperating with the Wisconsin Experiment Station in the badly eroded areas in Southwestern Wisconsin.

COVILLE:

I suppose the shortest statement of the problem in these sections is to say that in order to control heavy erosion damage to farm land, we have to adopt a system of management of the land which places cultivated fields in the more or less level bottoms and on the gentler upland slopes; pasture or hay lands on the slopes just steeper than the ones that can be plowed without bad erosion; and tree growth on the still steeper slopes that can't be used for pasture or hay land.

We know that a fully stocked forest makes the most effective vegetative cover to stop erosion of land. But let me remind you that forests hold soil and water not alone because of the trees, but because of the layer of dead and living vegetation on the ground beneath the trees. Some of the Forest Service men ran an experiment to find out the true value of the forest litter in keeping soil open to hold water and check erosion.

SALISBURY:

Does the litter itself soak up and hold the rainfall?

COVILLE:

Yes, the litter will take up considerable quantities of water. But that's not its main value. The mantle of litter prevents erosion, so only clear water reaches the surface of the soil. Therefore the surface soil stays porous and very absorbent and is able to take up much larger quantities of this water than bare soil. The experiment I referred to illustrates this protective function of forest litter. The plots from which the forest litter had been burned off lost 2300 times as much soil by erosion as the plots with forest litter undisturbed. Another group of experiments in California showed that the removal of the vegetative cover by fire invariably makes the runoff of water 15 or 20 times greater than the runoff from unburned areas.

If woods and range lands are to be effective in conserving soil and water, we must prevent extensive overgrazing and keep out fires. We can do this by sensible grazing and sensible timber production. Thus we can save the soil and if later on our descendants want to clear the forest land for cultivation or pasture they will have good land to use.

JONES:

Coville, I wish you'd call attention to the use of tree planting, in stabilizing gullies that have already formed and keeping them from extending.

COVILLE:

Well, People are successfully using trees and other plants for this purpose in many sections. In the eastern United States black locust is one of the species most commonly used for planting in gullies. These tree plantations improve the soil. And they yield profitable timber crops. But I think we're all agreed that the thing to do is not to confine ourselves to reclaiming gullies, but to keep them from forming.

BENNETT:

And besides keeping gullies from forming, the problem of the landowner and of the nation is to stop the even more extensive sheet erosion, that is, the slow removal of the topsoil over entire fields -- that agency which takes away part of the soil every time it rains. We have been able to give you in this discussion today only glimpses of the results showing up in the experimental work at the soil erosion stations. Speaking on behalf of the Department of Agriculture we want to invite all of you who live in the vicinity of the soil erosion stations and any of you who happen to be near them on your trips to stop in and see the experimental plots and talk over the results with the men at the stations. We shall be glad to give you the information we have on how to apply strip cropping, grass dams, strip subsoiling, and the other methods to your own problems of erosion control.

JONES:

And the engineers will give you our most recent information on the best

methods of constructing terraces and soil saving dams for different sections of the country and the use of farm machinery on terraced lands.

SALISBURY:

All of us are grateful to you gentlemen for the report you have given us on the progress of research by soil scientists, engineers, and foresters into methods of controlling menacing soil erosion. We shall expect you to visit with us again as further results from your work become available. Thank you very much, Mr. Bennett, Mr. Jones, and Mr. Coville.

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